The FPix Simulation under CMSSW

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Oct. 10, 2005

Outline

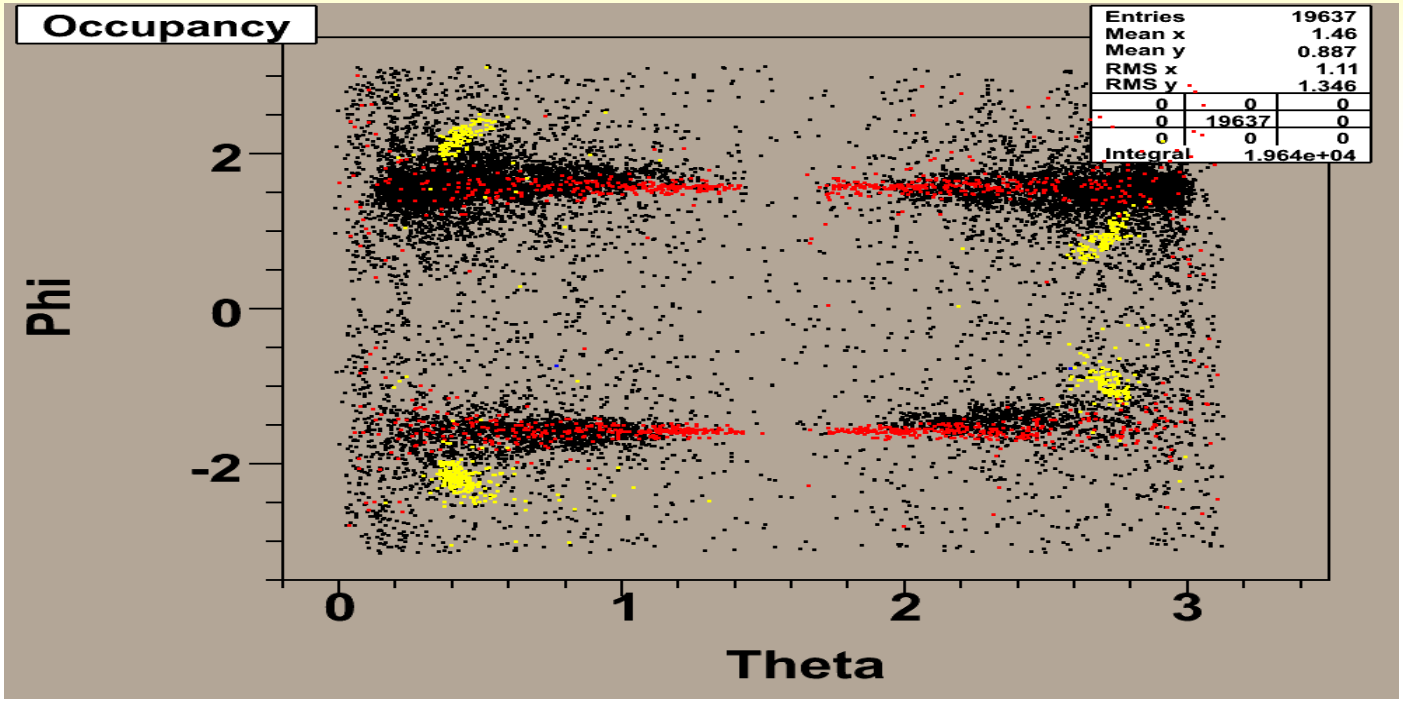
- Status of FPix Simulation Software
- The FPix Simulation Under OSCAR
- The FPix Simulation Under CMSSW
- The New Numbering Scheme
- What to do next

Status of FPix Simulation Software

- **Currently, There are two frameworks:**
  - OSCAR (The old simulation framework of CMS)
  - CMSSW (The new framework for Resc, Simu, analysis)
    - Underway
    - the first version: CMSSW_0_1_0 is available
- **There are two kinds of Geometry**
  - The old Geometry converting from Geant3.
  - The new Geometry in DDL (Dima, Victoria and Neeti)
- **There are three kinds of FPix Simulation**
  - Old Geometry + OSCAR (practice test)
  - Old Geometry + CMSSW (practice test)
  - New Geometry + CMSSW (real work)

The FPix Simulation Under OSCAR

- Old Geometry
- ParticleGun:
  - Pion plus (211)
  - 1000 event
- Black : Silicon
- Red: PixelBarrel
- Yellow: FPixel



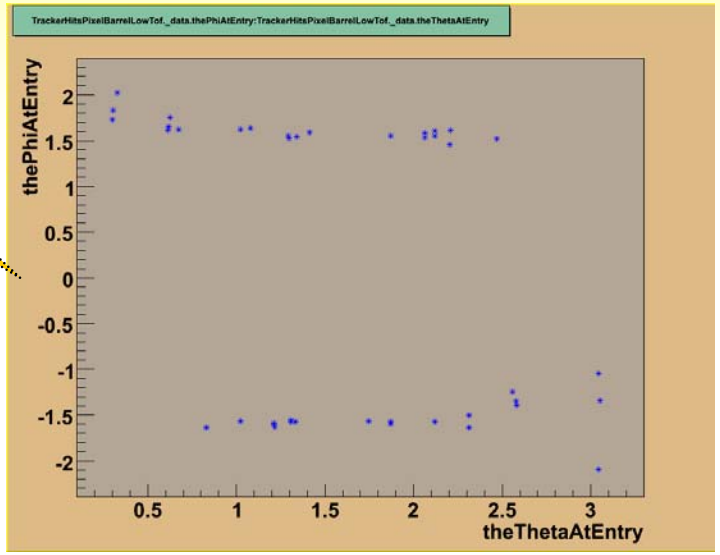
- the angles are in the local frame of the sensor(!)

Since the angles are in the local frame of the sensor (!)
the distribution looks correct to me:
in phi the tracks are mostly perpendicular, pointing "up" or "down",
so you have clusters around +/- phi/2.
In theta there are few tracks that cross perpendicularly. (Teddy TODOROV)

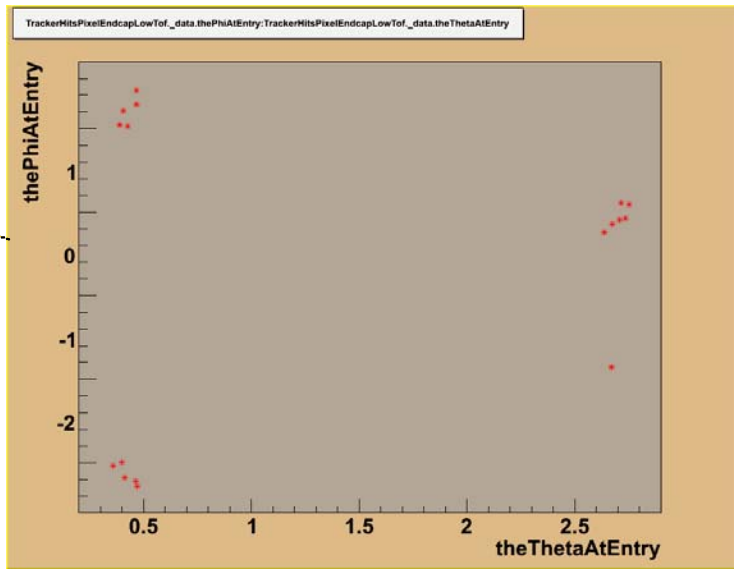
The FPix Simulation Under CMSSW

- Old Geometry
- Particle Gun have not been available in CMSSW
- Use one data sample provided in CMSSW Tutorial.
- Only 99 events
- Similar Result with last one, only difference due to small statistics

BarrelPix

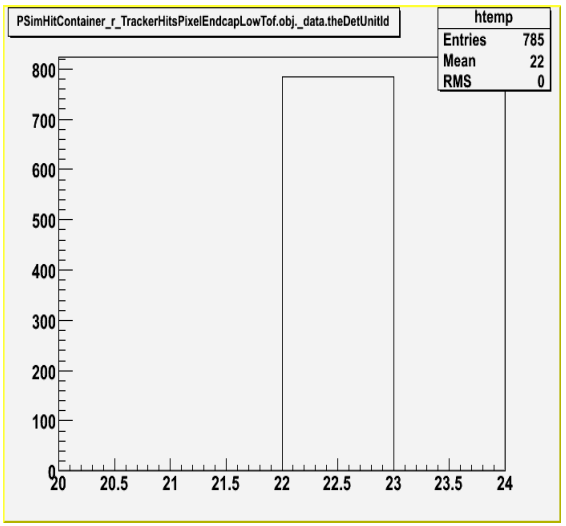


FPix



The New Numbering Scheme(1)

- The whole track's Numbering Scheme have not been ported into CMSSW.
- Currently, All hits get one fake DetID (22
- We had a phone conversation last Friday.
  - Filippo Ambroglini
  - V. Daniel Elvira
  - Harry Cheung
  - Neeti Parashar
  - Xingtao Huang



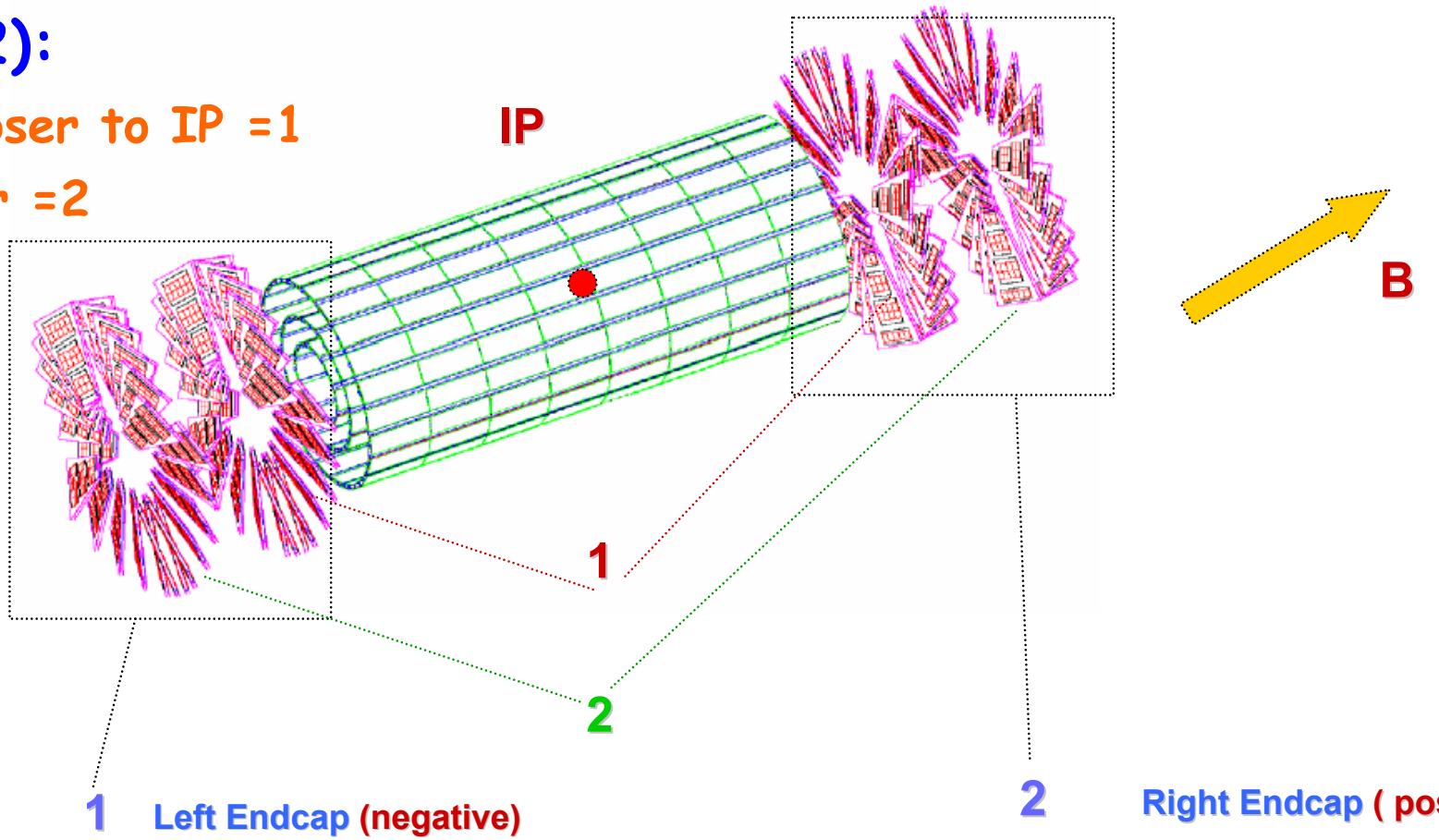
- Decide a new proposal based on the Victoria's.

  http://agenda.cern.ch/fullAgenda.php?ida=a054952

- Bit-Packed Scheme
- Main scheme: start with lowest value closest to IP

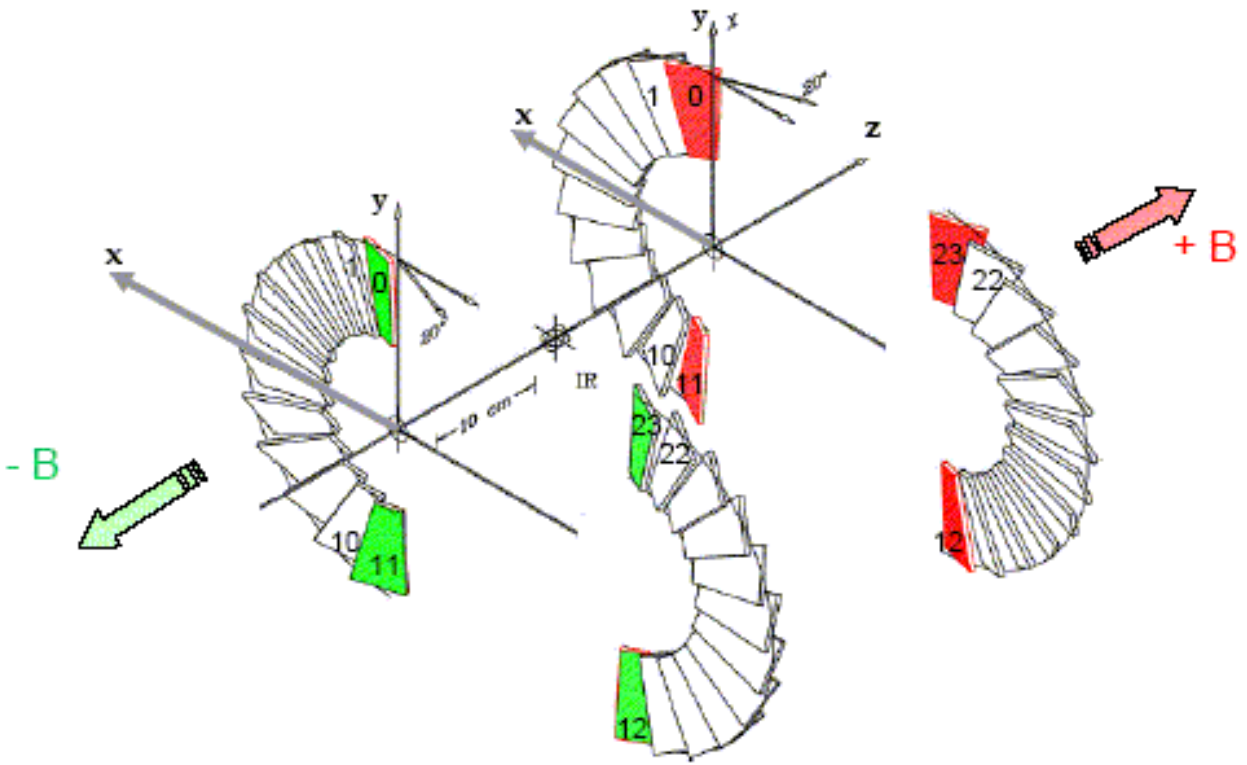
EndCaps & Disks

- EndCaps (1,2)
  - Left Endcap =1; Right Endcap =2
- Disks(1,2):
  - Disk closer to IP =1
  - Another =2



Blades& Panels

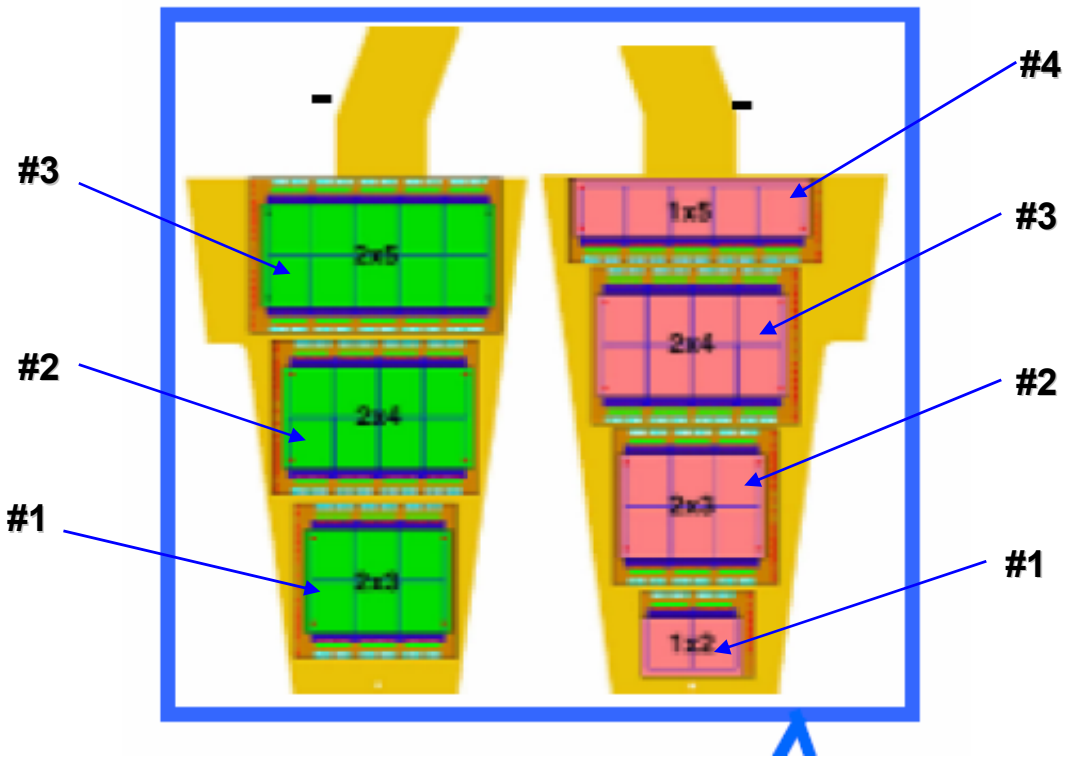
- Blades (1-> 24)
  - Start at Phi=0 with Blade #1
  - Increase anti-clockwise
- Panels (0,1)
  - Forward: 0
  - Backward: 1



Plaquettes

- Start at IP and Work out…

- On 3-Panels
  - 2x3 is plaquette #1
  - 2x4 is plaquette #2
  - 2x5 is plaquette #3
- On 4-Panels
  - 1x2 is plaquette #1
  - 2x3 is plaquette #2
  - 2x4 is plaquette #3
  - 1x5 is plaquette #4



The New Numbering Scheme(3)

Component	Valid Values	Number of bits
Subdetector ID	"*FPix*"	4
Barrel/Endcap	1	1
Left/Right Endcap	1,2	2
Disk	1,2	2
Blade	1 → 24	5
Panel	0,1	1
Plaquette	1, 2, 3, 4	3

Total Bits: 18

What to do next

- Write code to implement the new numbering Scheme
- Integrate the new Geometry into CMSSW when New Geometry released
- Check Geometry
- Check Hit information